



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/761,301 | 01/16/2001 | Ronald P. Schmidt | LOCK1880 | 3846 |

7590 08/25/2003

James E. Bradley
Bracewell & Patterson, LLP
P.O. Box 61389
Houston, TX 77208-1389

EXAMINER

PIAZZA CORCORAN, GLADYS JOSEFINA

ART UNIT

PAPER NUMBER

1733

DATE MAILED: 08/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/761,301

Applicant(s)

SCHMIDT, RONALD P.

Examiner

Gladys J Piazza Corcoran

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13,15-20,22-24,26-29,32,39,43,45 and 46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13,15-20,22-24,26-29,32,39,43,45 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on June 24, 2003 is: a) ☒ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 14.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: See Continuation Sheet.

Continuation of Attachment(s) 6). Other: As to the proposed drawing correction, please see the attached office action.

FINAL ACTION

Drawings

1. The drawings received on May 01, 2001 are not approved. The figures are not consistent with the originally filed figures filed on January 16, 2001 and the differences appear to be new matter, for example see figures 1C, 4, 7A-D, 9A, reference 40 in figure 10. Applicant is required to send in new drawings with the corrections as required by the Initial Patent Examining Division's Notice to File Corrected Applications Papers files on February 26, 2001 and with the newly proposed corrections filed on June 24, 2003 as approved below.
2. The proposed drawing correction for Sheet 1, figures 1A-E, 2, and 3; Sheet 3 figure 6B; and Sheet 6, figure 9B filed on June 24, 2003 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.
3. The proposed drawing correction for sheet 2, figure 4 filed on June 24, 2003 have been disapproved. The pencil line with the reference number 25 is considered new matter as discussed below, however, the other additions of the reference numerals 13, 15, 17, 19, 21, and 23 would be approved if submitted separately. A proper drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Specification

4. The amendment filed June 24, 2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The Specification now recites, "A line 25 that is normal to exterior side 21 equally bisects the corner formed by leg side 21 and base side 19. In the embodiment of Figure 4, base side 19 and leg side 21 are 90° relative to each other and of equal lengths." There is no support in the original specification, including the original drawings that describe or show the "line 25" normal to the exterior side and bisecting the corner. There is also no support in the original specification, including the original drawings that describe or show that the base side and the leg side are of equal lengths. It is noted that there is no indication that the originally submitted drawings are working drawings.

Applicant is required to cancel the new matter in the reply to this Office Action.

5. The disclosure is objected to because of the following informalities: Line 9 of the newly amended paragraph of the Specification on page 9 recites, "exterior side 21" which should be --exterior side 23--.

Appropriate correction is required.

6. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 23 and 26 recite, "a line extending normal to said exterior side of each of said pressure intensifiers passes through a corner formed by a

Art Unit: 1733

junction of said base with one of said legs.” While the specification recites that the line passes through a corner formed by a junction of the base side and the leg side of the pressure intensifiers, there is no recitation that the line passes through a corner formed by a junction of the base and one of the legs of the pre-form.

Claim Objections

7. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Claims 14 and 25 were cancelled in the Preliminary Amendment filed on August 31, 2001. It is suggested to submit the claims as new claims 47 and 48.

8. Claim 43 is objected to because of the following informalities: Claim 43 recites, “wherein said wherein said.” Appropriate correction is required.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 17, 23, 24-29, 32, 39, 43, 46 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

Art Unit: 1733

inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 17 recites that "said base side and said leg side of each of said pressure intensifiers are equal in length" and claim 32 recites that "said base side and said leg side of each of said pressure intensifiers are of the same length." There is no support or suggestion in the original specification that the sides of the pressure intensifiers are equal in length. It is noted that there is no indication that the originally filed drawings are working drawings.

Claims 23 and 26 recite, "a line extending normal to said exterior side of each of said pressure intensifiers passes through a corner formed by a junction of said base with one of said legs." There is no support in the original specification for such a line. It is also unclear what this limitation further adds to the claim language and it appears to have no relationship with the invention.

Claim 24 recites, "affixing an additional adhesive film between one side of a second pre-cured laminated composite structure and an inner surface of one of the legs of said 3-D woven textile pre-form, and inserting an additional adhesive film between an opposite side of said second pre-cured laminated composite structure and an inner surface of the other of said legs." While the specification discloses providing an adhesive film between the pre-form and a second pre-cured laminated composite structure, there appears to be no support for inserting an additional adhesive film between the pre-form and the second pre-cured laminated composite structure.

Art Unit: 1733

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 23 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Claims 23 and 26 recite, "a line extending normal to said exterior side of each of said pressure intensifiers passes through a corner formed by a junction of said base with one of said legs." There is no support in the original specification for such a line. It is also unclear what this limitation further adds to the claim language and it appears to have no relationship with the invention.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 13, 15-18, 22-24, 26, 27, 32, 43, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. (DE 19832441 C1 with English equivalent US Patent No. 6,306,239) in view of Abildskov (US Patent No. 4,782,864) and Hertzberg (US Patent No. 4,96,802) as further taken with Sloman (WO 98/50214).

Breuer discloses a method of forming a structural assembly by affixing a first pre-cured assembly (stringer core blanks 5) to a 3-D textile pre-form (stiffening profile members 7) impregnated with an uncured resin (column 4, lines 52-60; column 6, lines

Art Unit: 1733

9-26), affixing a second pre-cured assembly (skin member 6) (between the legs) to said 3-D textile pre-form (stringer core blanks 5) (column 5, lines 23-40) and curing the resin to form the structural assembly (column 7, lines 30-55).

As to the limitation that the 3-D perform is woven, Breuer does disclose that pre-form is a fiber reinforced composite material of fiber textile materials (column 6, lines 18-26), however Breuer does not specifically disclose that the pre-form is woven. Abildskov discloses that an improvement of prior art methods with a pair of fabric connectors is to provide one three dimensional woven fabric connector in order to avoid peel problems of the prior art methods (figures 1, 3; column 2, lines 35-68). As to the newly added limitations that the perform has a base and two legs extending from the base with the first pre-cured assembly on a side of the perform opposite the legs, the 3-D woven textile pre-form in Abildskov has an additional leg extending from the base, the pre-form is Pi-shaped, and as to claim 24, the legs are at a 90 degree angle (see figure 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer by providing a 3-D woven textile pre-form in a Pi shape in order to overcome peel problems associated with using two fabric pieces (stringer core blanks 5) as shown by Abildskov.

As to the limitations of an adhesive film being located between the first pre-cured assembly and the pre-form, an additional adhesive film being located between the second pre-cured assembly and the pre-form, and curing the adhesive films to form the structural assembly, Breuer only discloses curing the resin in the 3-D pre-form to

Art Unit: 1733

provide the bonding between the pre-form and the two pre-cured assemblies.

Hertzberg discloses it is known in the art to provide an adhesive film between parts of structural assemblies in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the resin in the parts for bonding when cured (column 1, lines 19-16; column 3, lines 25-31). Hertzberg further discloses that the adhesive film layers are placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4, line 47 to column 5, line 8; column 9, line 41). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer and Abildskov by providing adhesive film layers between the interfaces of 3-D pre-form and the pre-cured assemblies in order to reduce delamination and provide a stronger bond as shown by Hertzberg.

As to the newly added limitations of providing first and second pressure intensifiers of flexible material against exterior surfaces of the legs and base for pressing the base and legs of the pre-forms against portions of the pre-cured assemblies with the evacuation of the vacuum bag, it is well known in the art to provide such pressure intensifiers for properly applying pressure against corners of composite materials during curing. For example, Sloman discloses that it is known in the production of composite components to use a pressure transmitter to allow pressure to be applied to the composite components during their molding in a tool and for molding techniques that involve the use of a vacuum bag applied to the molding (pages 1, 3). In particular, pressure transmitters are used for the female features on the non-molded

Art Unit: 1733

side of the component (page 1). A flexible (elastomeric) pressure intensifier for a corner concave region is arranged on the composite corner with a base side on the base and a leg side on the leg and an exterior side that extends from an edge of the base side to the edge of the leg side (page 6; figure 2). The vacuum bag (19) is placed over the composite and the pressure intensifier to press the sides of the composite. As to claim 24, the pressure intensifiers are triangular in cross section (see figure 2). As to claim 46, the pressure intensifier in Sloman is a three sided polygon in cross section with two straight inner sides intersecting each other defining a corner portion and an exterior side that extends between edges of the inner sides (see figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, and Hertzberg, with pressure intensifiers on each of the two corner portions of the pre-form (thus using two pressure intensifiers) in order to provide proper pressure and molding to the corner structure of the composite during vacuum molding as is well known and exemplified by Sloman.

As to the newly added limitations of inserting the parts into the vacuum bag, Breuer discloses the step of curing is implemented by inserting the pre-cured assemblies and the pre-form into a vacuum bag and evacuating and heating the vacuum bag (column 7, lines 30-60). Clearly the adhesive films between the parts and the pressure intensifiers would also be inserted in the vacuum bag.

Even though claims 14 and 25 were previously canceled and must be rewritten as new claims, the pressure intensifier shown in Sloman meets their limitations. As to

Art Unit: 1733

claim 15, Breuer discloses the pre-cured assemblies are pre-cured laminated composite structures (column 4, lines 51-60; column 5, lines 23-40). As to claim 16, Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). As to claims 17 and 32, the pressure intensifier shown in Sloman (figure 2) appears to have a base side and a leg side with equal lengths. Furthermore, it would have been well within the purview of one of ordinary skill in the art to provide the sides with equal lengths, only the expected results would be attained. As to claim 18, the exterior side of the pressure intensifier in Sloman is concave (figure 2). As to claims 22 and 43, the material in Sloman for the pressure intensifier is an elastomeric material (rubber) (page 4). As to claims 23 and 26, a line that is normal to the exterior side of the pressure intensifier in Sloman passes through a corner formed by a junction of the base with one of the legs (see figure 2). As to claim 24, the adhesive film layers would be between all the surfaces of the pre-form and the pre-cured assemblies and therefore would be between the base of the pre-form and the pre-cured assembly and between the leg of the perform and the pre-cured assembly. As to claim 27, Breuer discloses the curing is implemented by heating the vacuum bag (column 7, lines 30-55).

16. Claims 19, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Sloman as applied to claims 13 and 24 above, and further in view of Leaversuch (Electron-Beam Treatment Upgrades a Range of High-Volume Materials) and/or Bersuch et al. (Affordable Composite Structure for Next Generation Fighters).

Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). Leaversuch discloses E-beam treatment for curing polymers (for example epoxy) reduces speed cycles, tooling, manufacture and energy costs, and provides increased dimensional stability in a variety of areas including advanced composites for aerospace and transportation parts. Bersuch also discloses E-beam treatment curing as a known method for curing structural assemblies (pages 1, 2, 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming structural assemblies as shown by Breuer, Abildskov, Hertzberg and Sloman by curing the resin in the structural assemblies through and E-beam treatment as shown by Leaversuch to reduce costs and increase dimensional stability in advanced composites for aerospace and transportation parts particularly since it is well known that the resin used in structural assemblies such as the ones in Breuer, Abildskov and Hertzberg is epoxy (see for example Hertzberg, column 1, line 68) and/or as shown by Bersuch as an alternative to heat curing in structural assemblies.

17. Claims 20, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg, Sloman as applied to claims 13, 24 above, and further in view of Bersuch et al. (Affordable Composite Structure for Next Generation Fighters) and/or Sheahen et al. (Robust Composite Sandwich Structures).

It is well known to apply additional composite overwrap plies on pre-forms for structural assemblies for a stronger joint bond. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) both disclose applying composite overwrap plies on an exterior

Art Unit: 1733

surface of a woven pre-form. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Sloman by providing an overwrap ply over an exterior surface of the woven pre-form as shown by Bersuch and/or Sheahen in order to provide a stronger and more secure joint. One of ordinary skill in the art would understand providing the overwrap plies prior to cure (thus, prior to pressing the leg sides of the pressure intensifiers against the legs) in order to properly form the composite in the well known manner, only the expected results would be attained.

18. Claims 39 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Sloman as applied to claims 24 and 13 above, and further in view of Mueller et al. (US Patent No. 6,173,925) and/or Morris et al. (US Patent No. 5,944,286).

It is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. For example, Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris discloses another example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Sloman by providing the pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to

Art Unit: 1733

provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. It is noted that Applicant has not asserted any criticality to the tapered edges.

19. Claims 24, 27, 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. (DE 19832441 C1 with English equivalent US Patent No. 6,306,239) in view of Abildskov (US Patent No. 4,782,864) and Hertzberg (US Patent No. 4,96,802) as further taken with Barnes et al. (US Patent No. 6,007,894).

Breuer discloses a method of forming a structural assembly by affixing a first pre-cured assembly (stringer core blanks 5) to a 3-D textile pre-form (stiffening profile members 7) impregnated with an uncured resin (column 4, lines 52-60; column 6, lines 9-26), affixing a second pre-cured assembly (skin member 6) (between the legs) to said 3-D textile pre-form (stringer core blanks 5) (column 5, lines 23-40) and curing the resin to form the structural assembly (column 7, lines 30-55).

As to the limitation that the 3-D perform is woven, Breuer does disclose that pre-form is a fiber reinforced composite material of fiber textile materials (column 6, lines 18-26), however Breuer does not specifically disclose that the pre-form is woven. Abildskov discloses that an improvement of prior art methods with a pair of fabric connectors is to provide one three dimensional woven fabric connector in order to avoid peel problems of the prior art methods (figures 1, 3; column 2, lines 35-68). As to the newly added limitations that the perform has a base and a pair of legs extending from the base at a 90 degree angle, the 3-D woven textile pre-form in Abildskov has an additional leg extending from the base, and the pre-form is Pi-shaped (see figure 3). It

Art Unit: 1733

would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer by providing a 3-D woven textile pre-form in a Pi shape in order to overcome peel problems associated with using two fabric pieces (stringer core blanks 5) as shown by Abildskov.

As to the limitations of an adhesive film being located between the first pre-cured assembly and the pre-form, additional adhesive films being located between the second pre-cured assembly and the pre-form, and curing the adhesive films to form the structural assembly, Breuer only discloses curing the resin in the 3-D pre-form to provide the bonding between the pre-form and the two pre-cured assemblies. However, Hertzberg discloses it is known in the art to provide an adhesive film between parts of structural assemblies in order to prevent delamination and provide a stronger bond than the prior art methods of only utilizing the resin in the parts for bonding when cured (column 1, lines 19-16; column 3, lines 25-31). Hertzberg further discloses that the adhesive film layers are placed between the joined surfaces of the parts of the structural assembly and then the structural assembly is cured (column 2, lines 55-68; column 4, line 47 to column 5, line 8; column 9, line 41). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming a structural assembly as shown by Breuer and Abildskov by providing adhesive film layers between the interfaces of 3-D pre-form and the pre-cured assemblies in order to reduce delamination and provide a stronger bond as shown by Hertzberg.

Breuer discloses the pre-form and the pre-cured assemblies are placed in a vacuum bag that is evacuated and heated for curing, where the evacuation causes

Art Unit: 1733

pressure against having an exterior portion/surface of the pre-form not between the pre-cured assemblies to press the pre-form against the pre-cured assemblies (column 7, lines 30-55).

As to the newly amended limitations that a pair of flexible pressure intensifiers are provided, Barnes discloses a method of curing a structural member by where the pressure against the parts is facilitated by providing a pressure intensifiers (silicone rubber blocks 221) that are triangular in cross section (column 6, lines 12-19; column 8, lines 45 and 46) against a base and the exterior surface of the leg portions of the pre-form (body sheet 53), placing the pressure intensifiers (221), pre-form (53) and structural assembly parts (43, 83) in a vacuum bag and evacuating the bag in order to cause the pressure intensifier to press the pre-form against the other structural assembly parts (see figure 25; column 8, lines 30-35, column 9, lines 14-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the structural assembly as shown by Breuer, Abildskov and Hertzberg by providing pressure intensifiers in the vacuum bag during curing in order to provide pressure against the assembly parts for proper bonding as shown by Barnes.

As to claim 27, Breuer discloses the curing is implemented by heating the vacuum bag (column 7, lines 30-55). As to claim 43, the pressure intensifiers in Barnes(silicone rubber blocks 221) are formed of rubber.

20. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Barnes as applied to claim 24 above, and further in view of Leaversuch (Electron-Beam Treatment Upgrades a Range of High-

Art Unit: 1733

Volume Materials) and/or Bersuch et al. (Affordable Composite Structure for Next Generation Fighters).

Breuer discloses curing the structural assembly with heat and pressure (column 7, lines 30-55). Leaversuch discloses E-beam treatment for curing polymers (for example epoxy) reduces speed cycles, tooling, manufacture and energy costs, and provides increased dimensional stability in a variety of areas including advanced composites for aerospace and transportation parts. Bersuch also discloses E-beam treatment curing as a known method for curing structural assemblies (pages 1, 2, 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the method of forming structural assemblies as shown by Breuer, Abildskov, Hertzberg and Barnes by curing the resin in the structural assemblies through and E-beam treatment as shown by Leaversuch to reduce costs and increase dimensional stability in advanced composites for aerospace and transportation parts particularly since it is well known that the resin used in structural assemblies such as the ones in Breuer, Abildskov and Hertzberg is epoxy (see for example Hertzberg, column 1, line 68) and/or as shown by Bersuch as an alternative to heat curing in structural assemblies.

21. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg, Barnes as applied to claim 24 above, and further in view of Bersuch et al. (Affordable Composite Structure for Next Generation Fighters) and/or Sheahen et al. (Robust Composite Sandwich Structures).

It is well known to apply additional composite overwrap plies on pre-forms for structural assemblies for a stronger joint bond. For example, Bersuch (page 9) and/or Sheahen (pages 6-7) both disclose applying composite overwrap plies on an exterior surface of a woven pre-form. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Barnes by providing an overwrap ply over an exterior surface of the woven pre-form as shown by Bersuch and/or Sheahen in order to provide a stronger and more secure joint. One of ordinary skill in the art would understand providing the overwrap plies prior to cure (thus, prior to pressing the leg sides of the pressure intensifiers against the legs) in order to properly form the composite in the well known manner, only the expected results would be attained.

22. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Breuer et al. in view of Abildskov, Hertzberg and Barnes as applied to claim 24 above, and further in view of Mueller et al. (US Patent No. 6,173,925) and/or Morris et al. (US Patent No. 5,944,286).

It is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. For example, Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris discloses another example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the

Art Unit: 1733

time of the invention to provide a method of forming a structural assembly as shown by Breuer, Abildskov, Hertzberg, and Barnes by providing the pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. It is noted that Applicant has not asserted any criticality to the tapered edges.

Response to Amendment

23. Applicant amended the Specification and the claims to recite that each of the pressure intensifiers is a three-sided polygon with a triangular cross-section. It appears that this amendment is supported by the original figure 4 of the Drawings. It appears as though one looking at the figure would understand that the pressure intensifiers would be triangular. It also appears reading the original specification as whole that there is no particular significance to the particular shape of the pressure intensifier.

Response to Arguments

24. Applicant's arguments filed June 24, 2003 have been fully considered but they are not persuasive. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues on page 11 that the newly amended limitation that the pressure intensifiers are of a triangular cross section is not shown in Barnes. Examiner agrees that the vertical cross-section of the pressure intensifiers in Barnes are rectangular as Applicant states, however, the horizontal cross section of the pressure intensifiers in Barnes are triangular in cross section and fully meet the limitations of independent claim

Art Unit: 1733

24 (see figures 1, 9, 19; column 6, lines 12-19; column 8, lines 45 and 46).

Furthermore, the newly cited reference, Sloman, clearly discloses using pressure intensifiers for corners that are triangular in cross section in the vertical direction (see figure 2).

Applicant further argues on page 11 that there is no suggestion of a pre-cured structure located between the blocks in the reference Barnes. The rejection was and is based on the reference Breuer which clearly shows a pre-cured structure (5) within a perform (7). The reference Barnes was cited to show that it is known in the art to apply pressure intensifiers in the vacuum bag when curing composite structures in order to properly cure the composite to the proper shape.

Applicant also argues on page 11 and 13 that Barnes does not disclose the newly amended limitations to claims 13 and 46 of the structure of the pressure intensifiers. The newly cited reference Sloman fully discloses a pressure intensifier as claimed (see figure 2).

Applicant argues on page 12 the various newly amended limitations in claims 14, 17, 18, 23, 25, 26, 32 are not shown by the references. The newly cited reference Sloman fully discloses a pressure intensifier as newly claimed (see figure 2).

Applicant argues on page 13 that Mueller shows adhesive strips that form a tapered structure but not woven pre-forms that taper in thickness and that Abildskov shows a woven pre-form but does not taper in thickness. The rejection for the tapered limitation is based on the references Mueller et al. and/or Morris et al. It is noted that Applicant did not address the merits of the Morris reference. It is also noted that the

Art Unit: 1733

claims do not exclude forming a tapered edge by layering as shown in Mueller. The claims merely require that the pre-form have tapered edges. As discussed above, it is known to provide tapered edges on a pre-form for structural assemblies in order to provide a more aesthetic transition, to provide a greater surface area for bonding, and for better transmission of loads on the structural assembly. Mueller discloses an example of a pre-form (27) in a structural assembly with tapered edges (figure 1; column 3, line 64 to column 4, line 23; column 4, lines 53-60). Morris also discloses an example of a pre-form (6, 7) in a structural assembly having tapered edges (see figure 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a pre-form with a tapered edge as is well known in the art and exemplified by Mueller and/or Morris in order to provide a structural assembly with a more aesthetic transition, greater surface area for bonding, and better transmission of loads on the assembly. Again, it is noted that Applicant has not asserted any criticality to the tapered edges.

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not


Art Unit: 1733


mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gladys J Piazza Corcoran whose telephone number is (703) 305-1271. The examiner can normally be reached on M-F 8am-5:30pm (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Gladys JP Corcoran
August 20, 2003


Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700